East Waterway Anthropogenic Background Small Group Meeting #5

Anthropogenic Background AB Calculation and Memo Outline

East Waterway Group

December 9, 2020

Meeting Agenda

- AB Dataset
  - Dioxin/furan congener selection
  - 95UCL statistic
- Fines Normalization
- Arsenic Discussion Continued
- Sensitivity Analysis Observations
- Memorandum Outline
- Large Group Meeting Presentation *(Jan. 13, 10-12)*

AB Dataset

Dioxin/furan Update

- Appendix C of SRI presents percent contribution of TEQ for each tissue type (Figures C.3-6 and C.3-7)
- Resulted in four congeners identified as being primary contributors to TEQ in EW fish/crab tissues (Table C.3-2)
  - 2,3,7,8-TCDD
  - 2,3,7,8-TCDF
  - 1,2,3,7,8-PeCDD
  - 2,3,4,7,8-PeCDF

  Note: clams/geoduck tissues not included because of low frequency of detection

Dioxin/furan Update

- Percent contribution of four congeners to seafood consumption risk
  - Pending analysis is percent contribution of seafood consumption risk for these four congeners; this analysis accounts for the seafood consumption ingestion rates of each tissue type
- Sediment RBTC for each congener
  - Appendix C of SRI presents dioxin/furan TEQ sediment RBTCs, not congener specific RBTCs
  - Pending analysis is development of congener specific sediment RBTCs for risk drivers followed by a comparison of congener AB values to these RBTC values

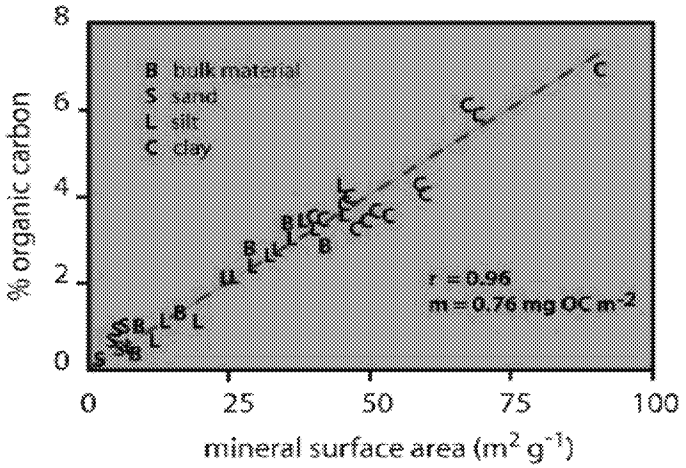
Updated Base Case Results

Chemical	Unit	n	Det.	UCL Method	Mean	UCL95
Total PCBs	ug/kg	49	49	95% Adjusted Gamma UCL	17.0	22.8
Arsenic	mg/kg	52	52	95% Student's-t UCL	17.2	19.3
1,2,3,7,8-PeCDD	ng/kg	54	46	95% KM Approximate Gamma UCL	1.32	1.68
2,3,4,7,8-PeCDF	ng/kg	54	45	95% KM Approximate Gamma UCL	0.739	0.934
2,3,7,8-TCDD	ng/kg	54	42	95% KM Approximate Gamma UCL	0.467	0.573
2,3,7,8-TCDF	ng/kg	54	46	95% KM Approximate Gamma UCL	0.719	0.931

Fines Normalization

Modified Fines Normalization (Surface Area Method)

- Previously presented fines normalization calculation:
  - Contamination is 100% associated with fine-grained suspended sediment (i.e., < 62.5 um diameter)
  - Settling in the EW is fine-grained sediment
- Modified fines normalization calculation (surface area method):
  - Organic contamination concentration is proportional to the surface area of particulate
    - finer particles = higher surface area and concentration
    - coarser particles = lower surface area and concentration
  - Settling in the EW is based on modeled hydrodynamics
    - four particle classes in the LDW STM

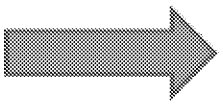


Sediment Transport by Particle Size

Class	Diam. (um)	Green Mass (%)	Green Surface Area (%)	Entering EW Mass (%)	Entering EW Surface Area (%)
1a	10	17%	56%	56%	85%
1b	40	50%	42%	38%	14%
2	260	10%	2%	6%	0.4%
3	1,080	23%	1%	0%	0.0%

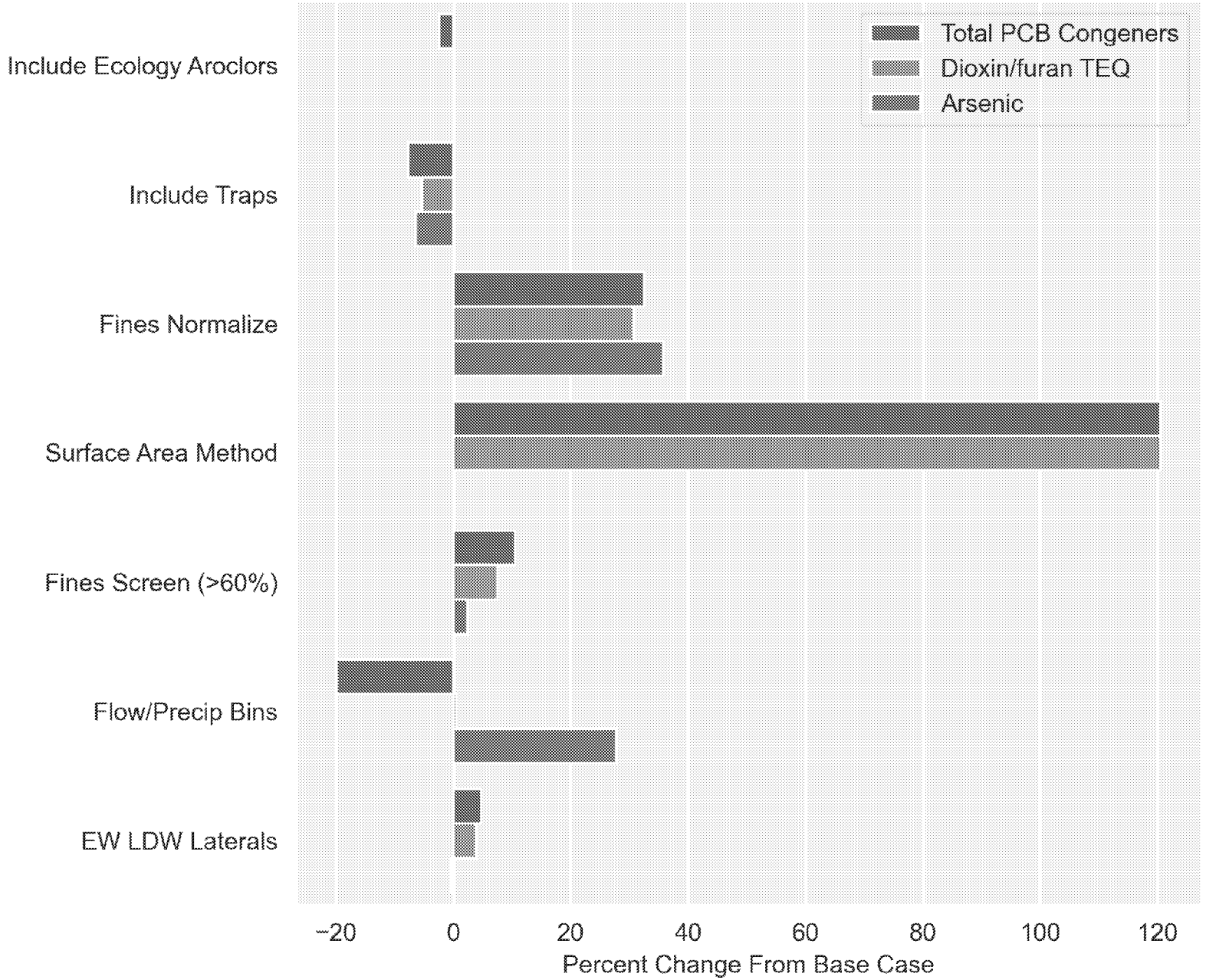
- From the LDW STM Model

Class	Diam. (um)	Green PCBs (ug/kg)	Green DF TEQ (ng/kg)	Entering EW PCBs (ug/kg)	Entering EW DF TEQ (ng/kg)
1a	10	57	21	57	21
1b	40	14	5.1	14	5.1
2	260	2.6	0.9	2.6	0.9
3	1,080	0.6	0.2	0.6	0.2
Weighted Average		17	6.1	38	14



- Based on particle surface area-weighting

AB Calculation Methods Compared to Base Case

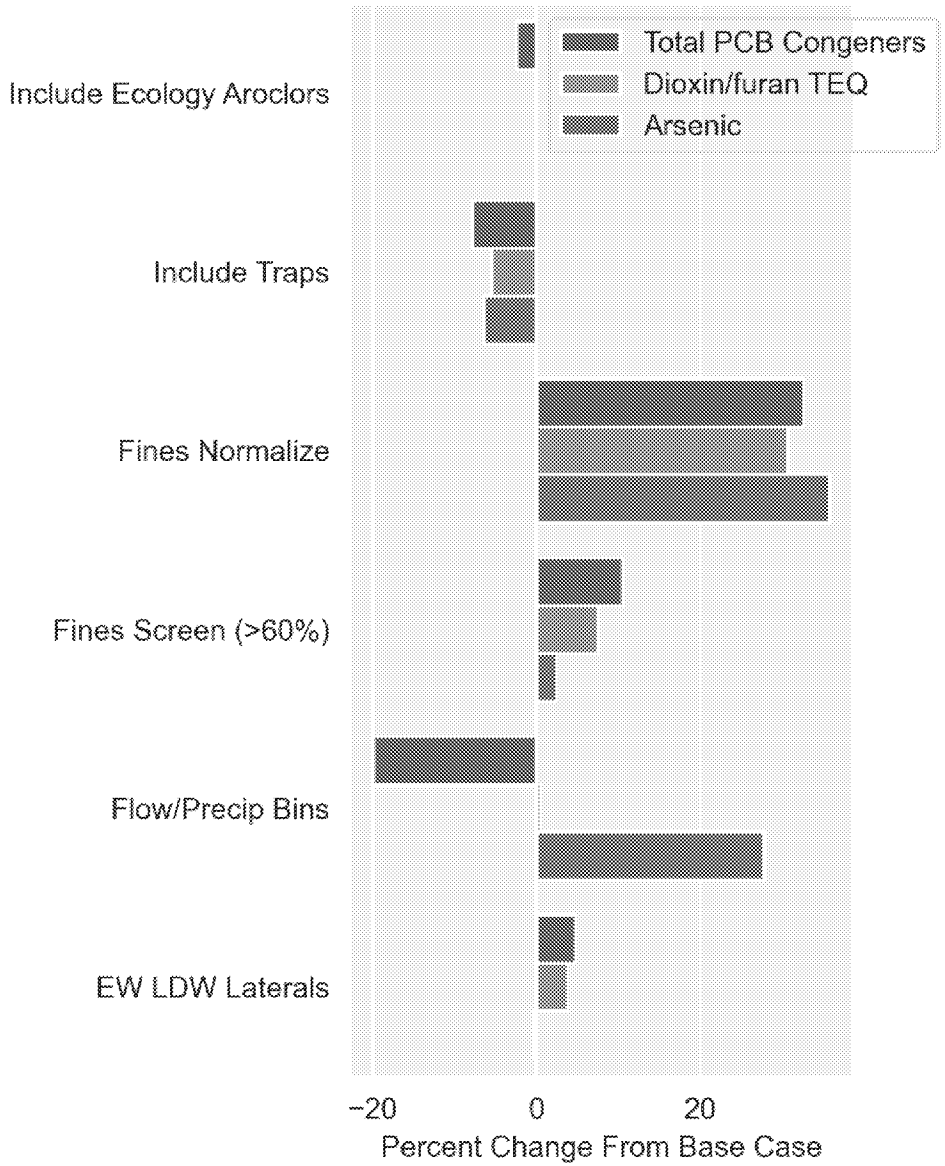


Arsenic Discussion Continued

Arsenic

- EWG agrees that 17 mg/kg represents suspended sediment in the Green River, but does **not** account for biogeochemical reactions once deposited
- EWG suggests that other lines of evidence (e.g., bedded sediment from upstream, post-remediation concentrations in nearby cleanup sites, and Elliott Bay sediment concentrations) be included in the AB memo to:
  - Provide context to the arsenic suspended sediment value, or
  - Be used for estimating AB for arsenic.

Sensitivity Analysis



- Aroclors had a similar distribution to the base case congener dataset; concentrations decrease slightly.
- Including traps decreased the concentration due to higher sand in traps and the effect of grain size on concentration.
- Fines normalization increases concentrations by accounting for low concentrations in sands which settle in the LDW largely in the turning basin.
- Fines screening excludes samples with high sand content with lower concentrations, resulting in higher average concentrations.
- Binning increases the impact of base flow conditions which are low in PCBs, high in arsenic, and neutral for D/F.
- Including urban inputs slightly increases concentrations of organics due to diffuse urban sources and has little effect on arsenic.

Memorandum Outline

Memorandum Outline

1. Introduction
2. East Waterway Conceptual Site Model
3. Representative Datasets and Selection
4. Green River Suspended Solids Dataset
5. Anthropogenic Background Calculation
6. Uncertainty and Sensitivity Analysis
7. Conclusion

A modification of this outline could be used as a starting place for the large group meeting agenda. EPA will provide feedback on draft materials. EWG will provide an outline in December, and draft meeting in January.

Work Products Ahead of Large Group Meeting